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ABSTRACT

Test items and procedures for administering and scoring individual tests of second and fifth grade reading and mathematics are presented. The major purpose of this individual testing is validation of the group tests which make up the battery of the Beginning Teacher Evaluation Study (BTES). Five mathematics tasks, involving a set of blocks, have been selected for use in a semi-structured interview. The five tasks are: ordering the numerals 1 through 10; renaming the numeral 10; place value; addition and regrouping; and subtraction with regrouping. A series of oral reading activities follows, in which a student is asked to read words, sentences, and short passages. Comprehension passages administered as a group test can also be administered individually; each session will consist of a repeated sequence of passage reading, question answering, and discussion/explanation. (The comprehension passages and questions are included in Appendix D of Technical Report III-1) (CP)

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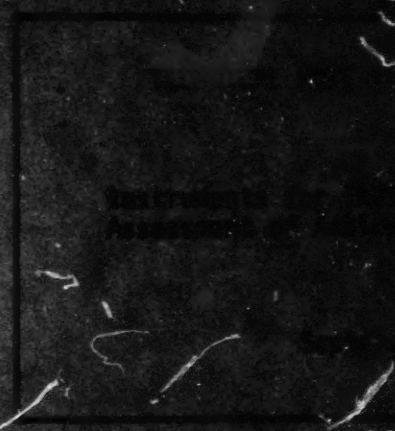
BTES

BEGINNING TEACHER EVALUATION STUDY

Technical Report



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Contents

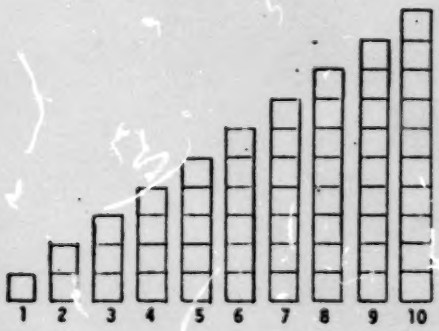
	Page
Introduction	1
Math Tasks (Study 1)	1
Materials	1
Procedure	1
Scoring	4
Reading Tasks (Study 1)	4
Materials	4
Procedure	12
Scoring	13
Reading Tasks (Study 2)	14
Materials	14
Procedure	14
Scoring	15
Reference Sources	16

Introduction

Task III of Phase IIIA Extension of the Beginning Teacher Evaluation Study is the development and refinement of a student test battery in reading and mathematics for grades 2 and 5. Technical Note III-2 presents a rationale and design for the use of individual testing during this developmental year. The major purpose of this individual testing is to validate the interpretation of the group-test measures which make up the main test battery. This technical note (III-3) presents the materials and procedures to be used in the individual test measures.

Mathematics Tasks (Study 1)

Materials. The mathematics tasks are all carried out using a set of manipulative materials along with a pencil and paper. The manipulative materials will be patterned after the Stern apparatus with unit blocks representing the numerals from 1 to 10. After the 1 unit block each number block is a solid piece with the 1-units marked off. Thus the 10 block is ten times as large as the 1 block and lines are marked on its surface to show the ten one unit blocks to which it is equivalent. A set of blocks, arranged in order, is shown below:



Procedure. Five manipulative tasks have been selected for use. The five tasks are ordered in terms of difficulty and allow the child to demonstrate his conceptual understanding of mathematical processes. Each task will be carried

out in a semi-structured interview situation. A description of the procedure for each task is given below:

Task 1. Ordering the Numerals 1 through 10.

Mix up the units from 1 to 10 and have child put them in the correct ascending order stating each numeral's name as it is placed. Ask child about the pattern/relationship between these numerals in such a way that the child will state that each number is one more than the previous one (and visa versa in descending order).

This task should be a successful one for all students since knowledge of the numbers and order of the numbers from 1 to 10 is a first grade skill. As well as being a successful first task, this task will also provide a concrete experience that will define the numeral representation of each block for the child. Task 1 will also serve as a baseline prerequisite task to verify that each child does have the minimum skill of knowing the numbers from 1-10.

Task 2. Renaming the Numeral 10.

Using the ten unit block for matching (visual verification) the child will be asked to rename the numeral 10 by using two other number blocks that when placed together will equal 10. The student may be started on this task by putting the 1-unit block next to the 10 and asking what block needs to be added to the 1 to make 10. Once the child has placed the 9 block successfully she/he will be asked to write the matching equation (a form will be provided for this). This task will continue until all the family of ten facts have been shown structurally and in written form. All the blocks needed, and only those needed, for this task will be placed in one pile for the child to draw from. The following ten equations should be arrived at:

10 = 1 + 9	10 = 6 + 4
10 = 2 + 8	10 = 7 + 3
10 = 3 + 7	10 = 8 + 2
10 = 4 + 6	10 = 9 + 1
10 = 5 + 5	10 = 10 + 0

This task should also be a successful one for the majority of children and serves as another baseline task to verify the child's knowledge of the basic fact combinations of 10 prior to testing for the role of 10 in the number system. This task corresponds to the Renaming Numerals, Equation Form Scale in the Grade 2 test battery. It also requires the application of the commutative (order) principle of addition and in this connection the child may be asked to confirm that the order of addends does not affect the sum.

Task 3. Place Value

The child is asked to write the numeral 34 and then asked to state how many tens and ones there are. Looking at the written numeral ask which number is in the tens place and which is in the ones place.

Making all blocks available to the child, he/she is asked to show the numeral 34. Repeating the child's previous statement on how many tens and ones there were in 34, ask if she/he still thinks that is correct.

After completing the discussion of 34 ask the child to write the numeral 99. Remove the four block and leaving the three ten blocks ask the child to make the number 99. As the child starts this task ask how many more tens he thinks he'll need to get to 90. After reaching 99 (or whatever is completed) ask how many tens and ones are shown. Ask if that matches what he wrote and if so how does he know that. If the blocks and written numeral do not match and the child states that they do not, ask him to go back to the blocks and try again. As he is doing so ask him to say what he is doing.

After completing 99 ask how much more is needed to make 100 and have him show it. Ask how many ones and how many tens. Then ask him to write 100 and ask what number is in the ones, tens, and hundreds place. From there move on to how many tens in 100 and what do we call 10 tens.

The final stage in this task is to have the tester add 3 ten blocks and a four block to the one hundred shown and to ask the child what number is now shown. Tester then writes the numerals 134, 341, and 413, and asks the child to read them. Tester then points to each numeral, one at a time, and asks the child what the 3 means.

Task 3 is obviously the heart of the matter and will be more difficult for the children. However, the child's ability to deal with each stage within this task should provide accurate information on his understanding of the relationship between a digit's position within a numeral, its face value, and its total value.

Task 4. Addition and Regrouping

The child is asked to solve in written form an addition problem which requires regrouping, e.g.,

$$\begin{array}{r} 18 \\ +\ 15 \\ \hline \end{array}$$

Then the child is asked to verbalize the process he used to get his answer and then to check his answer by using the blocks. Particular attention should be given to the child who does the written problem incorrectly and then discovers his "mistake" when asked to prove it structurally. This child should be asked to redo the problem and verbalize the correct procedure. Attention should also be given to the child that can regroup "mechanically" in written form but is unable to show the process structurally.

For children who understand regrouping (carrying) they should be substituting the ten block for ten ones. In adding 18 and 15, the child should see that it is simpler to show the sum with 3 ten blocks and 3 one blocks than it is to use the original 2 ten blocks and the 13 one blocks. If this is done the child will be showing with the blocks what we actually do with the number figures. That is, never presenting more than nine ones but always substituting for ten ones its equivalent, one ten.

Task 4 is an application of Task 3 and it is expected that those children who are successful at Task 3 will also be successful at Task 4. These two tasks combined should provide accurate information on the child's conceptual level and his ability to solve a regrouping problem. These are primary skills which should be acquired during the second grade.

Tasks 1 and 4 will be the primary testing tasks and hopefully will be completed within 20 minutes. Depending on time and the child's ability, Task 5 will also be done.

Tast 5. Subtraction with Regrouping

Procedure will be the same as in Task 4, using the problem $\begin{array}{r} 24 \\ -\ 6 \\ \hline \end{array}$

Scoring. All interview sessions will be audio tape recorded so that each student's performance can be analyzed in depth. Testers will supplement this audio record by keeping notes about the child's actions. Initial scoring will use a straightforward categorization of responses as correct, incorrect, or non-attempt. In further analysis, attention will be given to the range of approaches underlying both correct and incorrect responses. The individual interview situation can be an excellent source of information on how a child confronts a problem and attempts a solution. Characteristics of the way a child deals with numbers can be assessed. Systematic misunderstandings can be identified. There should be a relationship between response patterns on the individual assessment tasks and choice of distractors on the group test.

Reading Tasks (Study 1)

Materials. The grade 2 individual testing in study 1 involves a series of oral reading activities. Students will read words, sentences, and short passages. The materials to be used are shown in the following pages. Each page is identified by a task number, which matches the task number referred to in Technical Note III-2 and in the procedure section following the materials.

Task 1

SIGHT WORDS

1. might
2. of
3. there
4. was
5. from
6. one
7. what
8. some
9. night
10. whose
11. know
12. where
13. what
14. have

Task 2

WORD LIST

1. nest
2. chair
3. thin
4. pencil
5. kite
6. spoon
7. left
8. coat
9. pail
10. shirt
11. plate
12. beard
13. clown
14. hammer
15. mouth
16. palace
17. candle
18. turtle

TASK 3
WORDS IN CONTEXT

1. The bird made a nest in a tree.
2. Sonia sat in the big chair.
3. Mary is fat but Jill is thin.
4. You write with a pencil.
5. The children will fly a kite in the park.
6. You eat soup with a spoon.
7. Robert left his paper at home.
8. Ann put on her hat and coat to go outside.
9. The pail is full of sand.
10. Jim put on his pants and shirt.
11. Pat ate all the food on her plate.
12. The man has long hair and a long black beard.
13. At the circus we saw a funny clown.
14. I hit the nail with a hammer.
15. Mark put the candy in his mouth and ate it.
16. The king lives in a palace.
17. Jan lit the tall candle.
18. An animal that moves very slowly is a turtle.

TASK 4

SHORT AND LONG VOWELS--NONSENSE WORDS

1. kip
2. fube
3. dap
4. toak
5. lebe
6. fon
7. jode
8. fain
9. ket
10. vune
11. nade
12. meep
13. bime
14. nad
15. jod
16. seef
17. kipe
18. dape
19. bim
20. voal
21. kete
22. fub
23. leb
24. gaid
25. fone
26. vun

TASK 5
ORAL READING PASSAGES

Muff

Muff is a little yellow kitten.
She drinks milk.
She sleeps on a chair.
She does not like to get wet.

Jack

Jack made a house.
He made it out of a box.
The house has three big windows.
There is a flag on top.
The flag is red, white, and blue.

A New Pet

One Saturday a black dog was walking down a pretty city street. He had no home and no one to feed or to pet him. At last he was so tired he lay down to sleep for a short time.

Soon a small boy came by. "Are you lost?" he said. "Do you have a good home? I am glad I found you because I want a dog for a pet."

Camping

Six boys put up a tent by the side of the river. They took things to eat with them. When the sun went down, they went into the tent to sleep. In the night, a cow came and began to eat grass around the tent. The boys were afraid. They thought it was a bear.

A Day In The Park

It was a very fine day to be in the park. Two boys went there early to see the animals. But first they played ball with another boy. Then they took a long ride in a small boat.

At last they went to a big building which was called the zoo. But it was not open. So they did not see any of the animals that day.

Playground

Many people were busy all week on an empty lot near the park. Several boys were cleaning it off. Seven of them picked up old boards, sticks, and dry branches. Others cut the tall grass and carried it away. Then all the girls raked the ground and made it smooth. Al last two men came and built a strong fence. Then the children had a safe playground.

The Accident

A boy was hurt on our street yesterday. He had been playing ball and was riding his bicycle away from the ball field when a car came down the road. He did not see the car coming because he was looking back at the boys who were still playing ball. The car was going slowly. It hit the boy, but did not run over him. His arm was hurt and his bicycle was bent.

Procedure. Reading tasks will be administered following the mathematics tasks in each individual testing session. A brief description of the five reading tasks is given below:

Task 1. Sight Words

The student is told that we want to see how well he can read some words. Starting at the top of the list, the student is asked to read each word aloud. The student is asked to speak slowly and clearly. If the student has difficulty, he is encouraged to make an attempt or give a partial response, but no help is given to the child. The tester will score each word as correct or incorrect during the session.

Task 2. Word List
Task 3. Words in Context

The student will begin to read the words on the word list, as in Task 1. If the student cannot read a particular word, then the corresponding sentence context is provided. The student is asked to read the full sentence including the unknown word. If the child has difficulty reading a word other than the target word, then the difficult word is supplied by the tester. In this way each child will succeed in reading the context necessary to decode the word.

Task 4. Long-Short Vowels--Nonsense Words

Again the student is asked to read a list of words. Students are told that these words are not real words but that they are like real words that the student has read. The student is encouraged to pronounce each word as he thinks it should sound. If the student hesitates he is encouraged to think or a word he knows which is like the nonsense word.

Task 5. Passages--Oral Reading and Comprehension

In preparation for reading, the child is told that we want to see how well he can read some stories. He is told that no help will be given in reading words, and that he should just figure them out as best he can. The child is also told that he will be asked questions about the meaning of the story when he has finished reading.

Each child begins by reading aloud the first story in the set. The tester will record the amount of time needed to read the story. When the child has finished reading, he is asked to tell what the story was about. The tester will prompt for additional details by using words already introduced by the student. For instance, if the child says the first story is about Muff, the tester will respond "Who is Muff?" of "Tell me about Muff." Guidelines for probing will be worked out during the pilot testing of the procedure.

Depending on the child's performance on the first story, the experimenter will choose a second story for him to read. Students who have difficulty on story 1 will go on to story 2. Students who do well on story 1 will skip to story 3. Guidelines for routing the child through the sequence of stories will be worked out and will be based on successive estimates of performance level. Each child will read at least three stories.

Scoring. Tentative plans for scoring each task are indicated below:

Task 1. Sight Words

Each word will be scored right or wrong.

Task 2. Word List

Each word will be scored right or wrong. In addition specific elements of words will be scored separately. For example, in the word chair credit will be given separately for the initial digraph, ch, and for the vowel plus r, air. Each of these components relates to a different subscale in the decoding group test.

Task 3. Words in Context

Each word will be scored right or wrong. The student's total score will be the percentage of words he could decode correctly when the context was given as a clue.

Task 4. Long-Short Vowels--Nonsense Words

Only the pronunciation of the vowel will be considered in scoring. Errors will be coded as to the vowel sound given and whether it was long or short.

Task 5. Passages--Oral Reading and Comprehension

The first measure derived from the oral reading will be the amount of time taken by the student to read passage 1. This measure of reading speed can be compared to a number of group test measures, including automaticity of decoding.

The second analysis will focus on oral reading errors. One set of measures will be derived from a classification of word substitution errors. Word substitution errors are defined as instances where the student misidentifies a word and produces instead a different word or a nonsense word. Purposely excluded from the data base are instances of dialect differences in pronunciation or instances where the student produces an acceptable paraphrase form (we will for we'll). These cases do not represent true misidentification. Genuine substitutions will be examined for similarity to the original text word. As in task 2, word reading, phonetic elements of the original word will be scored separately. Measures will then be available of the type(s) of word features which cause the student difficulty. Parallel measures will be available from the group test, from individual word reading, and from story reading.

Oral reading errors will also be examined for patterns of grammatical and semantic acceptability. This analysis is based on the Goodman and Burke Reading Miscue Inventory (1972). Each substitution error will be analyzed according to questions 6 through 9 or their inventory:

6. Is the miscue corrected?
7. Does the miscue occur in a structure which is grammatically acceptable?
8. Does the miscue occur in a structure which is semantically acceptable?
9. Does the miscue result in a change of meaning?

Each of these questions is answered in a three-part scoring system--yes, no, and partly. The focus of these questions is on the child's understanding of what he is reading. Is the child making use of his knowledge of language to produce meaningful and grammatical statements.

The comprehension measures are included partly to encourage the child to treat the oral reading as a meaning-producing exercise. An analysis will be made of the number and quality of story elements recalled. Particular attention will be paid to the relationship between story recall and errors made during oral reading.

Reading Tasks (Study 2)

Materials. Study 2 is an examination of the reading comprehension measures in the group test. The materials used in the individual testing will be the same as those in the group test, that is, a set of comprehension passages with multiple-choice questions for each passage. If time constraints require the use of only part of the total number of passages, then special attention will be paid to including passages and questions which emphasize inference. The comprehension passages and questions are included in Appendix D of Technical Report III-1 (Filby and Dishaw, 1975).

Procedure. The comprehension passages will be administered as a group test in each of the 4 classes. Individual testing will be scheduled in the 2 weeks following the group testing. Each individual session will consist of a repeated sequence of passage reading, question answering, and discussion/explanation. The student will read the first passage aloud. Then he will read the first comprehension question aloud and choose an answer.

After the student has indicated his choice, the tester will ask the child why he thinks that answer is correct. This same question is asked regardless of which response choice the student has made. If the student's explanation is unclear, the tester may ask the student to rephrase or extend his answer. For some questions, the student will also be asked to explain why some response choices are incorrect. After the explanation has been given, the student will go on to the next question. Once all the questions for the first passage have been answered, the student will go on to the next passage. The second passage is read aloud, as was the first, and all questions are answered. For the remaining passages, the student will read the passage silently, but the questions and answers will be read aloud as before. Each session will be audio tape recorded.

Scoring. Scoring will be carried out during the testing whenever possible, with the tape as backup. Each student response to a comprehension question is coded as belonging to one of the following categories (from Horvath, 1974):

1. Correct choice and accurate explanation
2. Correct choice but no explanation and/or misunderstanding of the passage
3. Wrong choice and no explanation and/or misunderstanding of the passage
4. Wrong choice but plausible explanation

We will also look for instances in which the student changes his choice as a result of explaining his reasons. Both initial and subsequent responses will be coded. Of particular interest in test revision are responses in category 4.

Reference Sources

The following sources were consulted in the development of the individual tasks:

1. Design for Use of Individual Testing. Technical Note III-2, BTES Technical Report Series, Far West Laboratory, September, 1975. ED 156640

2. Filby, Nikola and Dishaw, Marilyn. Development and refinement of reading and mathematics tests for grades 2 and 5. Technical Report III-1, BTES Technical Report Series, Far West Laboratory, August, 1975. ED 151375

3. Goodman, Yetta and Burke, Carolyn. Reading Miscue Inventory Manual: Procedure for diagnosis and evaluation. New York: Macmillan, 1972.

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5. Horvath, Barbara. Reading tests and dialectal variation: A socio-linguistic critique of prescriptive reading tests. Unpublished paper, Georgetown University, June, 1974.

6. May, Lola J. Teaching Mathematics in the Elementary School. New York: The Free Press, 1974.

7. Spitzer, Herbert F. A device as an aid in teaching the idea of tens. The Arithmetic Teacher, March 1942, 65-68.

8. Stern, Catherine and Margaret B. Stern, Children Discover Arithmetic. New York: Harper and Row, 1971.

9. Williams, J. D., Teaching Technique in Primary Maths. London: National Foundation for Research in England and Wales, 1971.

The oral reading passages were taken from the following:

1. Durrell, Donald D. Durrell Analysis of Reading Difficulty. New York: Harcourt, Brace, and World, 1955

2. Gray William S. Gray Oral Reading Test. Indianapolis: Bobbs-Merrill, 1963.